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Rechargeable Li-ion Battery Product Specification
可充锂离子电池产品规格书

Cell Model/电芯型号：21700/4700mAh 3.7V

Prepared By/Date 编 制/日 期	Checked By/Date 审 核/日 期	Approved By/Date 批 准/日 期
陈金彪/2018/03/27		

Customer Approval 客户确认	Signature/签 字	Date/日 期
	Company Name/公司名称	
	Company Stamp/公司印章	

Amendment Records/修正记录

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Content/目录

1 Scope/适用范围

This specification is applies to describe the related Battery product in this Specification and the Battery/cell supplied by GREAT POWER ENERGY CO.,LTD only(Operation standard by GB31241-2014).

本说明书只适用于描述本规格书中相关的产品以及鹏辉能源有限公司提供的电池(执行标准 GB31241-2014）。

2 Cell Specification/电芯产品规格

No.	Items/项目	Specifications/规格		Remark 备注
1	Nominal Capacity 标称容量	4700mAh		0.2C Standard discharge 0.2C 标准放电
2	Minimum Capacity 最小容量	4600mAh		
3	Nominal Voltage 标称电压	3.7V		Mean Operation Voltage 即工作电压
4	Delivery voltage 交货电压	≥3.6V		Within 10 days from Factory 在出厂 10 天内
5	Charge Voltage 充电电压	4.2V±0.03V		By standard charge method 标准充电方式
6	Standard charging method 标准充电方式	0.2C constant current,4.2V constant voltage charge to 4.2V,continue charging till current decline to ≤0.01C		0.2C 恒流 4.2V 恒压充至电流≤0.01C ,时间约 7h(供参考)
7	Charge current 充电电流	0.2C	960mA	Standard charge, charge time about 7h(Ref) 标准充电，时间约 7h(供参考)
		0.5C	2400mA	Rapid Charge, charge time about: 3.5h(Ref) 快速充电，时间约 3.5h(供参考)
8	Standard discharging method 标准放电方式	0.2C constant current discharge to2.75V,		0.2C 恒流放电至 2.75V
9	Cell Internal Impedance 单电芯内阻	≤50mΩ		Internal resistance measured at AC 1KHz after 50% charge 半电态下用交流法测量内阻

3 Cell Specification/产品规格(continuous/续上表)

No.	Items/项目	Specifications/规格		Remark 备注
10	Maximum charge current 最大充电持续电流	0.5C	2400mA	For continuous charging mod 连续充电模式
11	Max. Discharge current 最大放电电流	1.5C	7200mA	Max. Discharge mod 最大放电模式
12	Operation Temperature and relative humidity Range 工作温度和湿度范围	Charge/充电	10~45℃ 60±25%R.H.	Charge at a very low temperature such as blew 0℃,will be get a lower capacity and reduce cycle life of the battery 低温充电效率会下降，会影响电池使用寿命
		Discharge/放电	-20~60℃ 60±25%R.H.	
13	Storage temperature for a long time 长时间储存温度	-20~25℃ 60±25%R.H.		Do not storage exceed half year. Must charge once when storage for half year. must charge the battery which with protect circuit when storage for three months. 不可超过半年,达到半年须充电一次 带保护板电池 3 个月充电一次

3 Battery/Cell performance test Criteria/电池性能标准

3.1 Appearance inspection by visual/外观目测

There shall be no such defect as rust, leakage, which may adversely affect commercial value of battery.

电池外观应没有锈渍、污渍、漏液等影响商业价值的缺陷存在。

3.2 Environmental test condition/外界环境条件

Unless otherwise specified, all test stated in this product specification are conduct at below test condition

所有测试应按以下环境条件进行，除非特殊指定外。

Temperature: 25±5℃

Relative Humidity:60%±25% R.H.

3.3 Cell Electrical characteristics/电气特性

No	Items/项目	Test Method and Condition/测试方法及条件	Criteria/标准	
1	Rated Capacity at 0.2C(Min.) 0.2C 最小额定容量	After standard charge, the capacity shall be measured on 0.2C discharge till the voltage discharge to2.75V, 标准充电后，放电至 2.75V,截止，测量 0.2C 放电容量	≥4700mAh	≥100%
2	Cycle Life 循环寿命	Charging and discharging battery as blew conditions 0.2C standard charge to 4.2V end-off 0.2C standard discharge to 2.75V cut-off Continuous charge and discharge for 500 cycles ,the capacity will be measure after the 500th cycle 充放电按以下条件： 0.2C 标准充电至 4.2V，0.2C 标准放电至 2.75V，连续充放电循环 500 周，在第 500 周结束后测量容量	≥80% of initial capacity	
3	Capacity retention 容量保持	The battery to be charge in accordance with standard charge condition at 20~25℃,then storage the battery at an ambient temperature 20~25℃ for 28 days. Measure the capacity after 28 days with 0.2C at 20~25℃ as retention capacity 将电池在 20~25℃标准充电后储存在 20~25℃的环境中 28 天 28 天后，测试电池在 20~25℃环境下 0.2C 放电容量作为保持容量	Retention capacity 容量保持 ≥85%	

4	Temperature Dependence of discharge capacity（放电温度特性）	Cells shall be charged per 3.3.1 and discharged @0.2 C_5A to 3.0 volts. Except to be discharged at temperatures per Table 3. Cells shall be stored for 3 hours at the test temperature prior to discharging and then shall be discharged at the test temperature. The capacity of a cell at each temperature shall be compared to the capacity achieved at 25 ºC and the percentage shall be calculated. . 电池按 3.3.1 规定充电。按表 3 的温度中放电，电池必须先在该试验温度中放置 3 个小时。	Each cell shall meet or exceed the requirements of Table 3 温度中的放电容量应不小于表 3 的要求

Table 3 （表 3）

Discharge Temperature （放电温度）	-20℃	-10℃	0℃	23℃	60℃
Discharge Capacity （0.2 C_5A） （放电容量/0.2 C_5A）	50%	65%	80%	100%	95%

4.4 Mechanical characteristics/机械特性

No	Items/项目	Test Method and Condition/测试方法及条件	Criteria/标准
1	Free fall test 自由跌落测试	The battery to be fully charged in accordance with standard charge condition, then drop the battery three times from a height of 1,0 m onto a concrete floor. The batteries are dropped once in two end faces and twice in round face.The battery is dropped four times in all. 电池按照标准充电条件充满电，然后从1m高度跌落电池到一个水泥地面，两个端面各跌落一次，圆柱面跌落两次，共计四次跌落。	No Fire, 不起火，不爆炸
2	Vibration test 振动测试	After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz and 55Hz, the excursion of the vibration is 1.6mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes. 将标准充电后的电芯固定在振动台上，沿 X、Y、Z 三个方向各振动 30 分钟，振幅 1.6mm，振动频率为 10Hz~55Hz，每分钟变化 1Hz。	No explosion ,No leakage, No fire 无泄漏,不起火，不爆炸

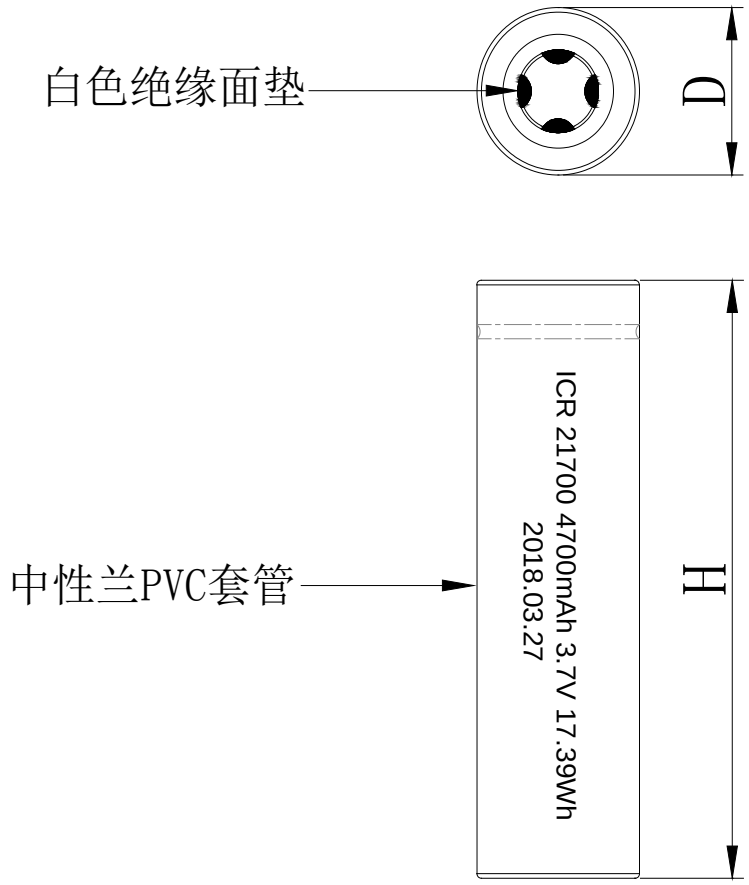
3	Pressure test 挤压测试	Put fully charged cell in the tablet by extruding,and the pressure between the tablet is13kN±0.78kN , unload after reaching the maximum pressure 将充满电的电池放在平板间进行挤压，两平板间施加13kN±0.78kN 的挤压力，当达到最大压力后卸压；	No fire, No explosion 电池不起火，不爆炸
4	Heavy load impact test 重物冲击测试	Put fully charged battery on the impact。The metal rod with a diameter of 15.8mm + 0.2mm is placed on the surface of the battery center. Put 9.1kg ± 0.1kg weight from the height of 610±25mm free fall, the battery with a metal rod gets impact and observe for 6h.The longitudinal axis of the battery should be parallel to the surface of the weight, and the metal rod is vertical with the longitudinal axis of the battery. 将充满电的电池放置于冲击台上，将直径 15.8mm±0.2mm 的金属棒横置在电池中心上表面，将 9.1kg ±0.1kg 重锤自 610±25mm 高度自由落下，冲击放有金属棒的电池，观察 6h,电池的纵轴向应与重物表面平行，金属棒与电池纵轴向垂直。	No fire, No explosion 电池不起火，不爆炸

4.5 Safety performance/安全性能

No	Items/项目	Test Method and Condition/测试方法及条件	Criteria/标准
1	Thermal exposure test 高温热冲击测试	Each fully charged cell, stabilized at room temperature, is placed in a circulating air-convection oven. The oven temperature is raised at a rate of 5 °C/min ± 2 °C/min to a temperature of 130 °C ± 2 °C. The cell remains at this temperature for 30 min before the test is discontinued. 充满电的电池温度稳定到常温后，放置入循环空气烘箱里，从常温以5 °C/分± 2 °C/分的速率升至130°C后，在130°C放置30分钟	No explosion, No fire 无起火,无爆炸
2	Short test 短路测试(20℃)	The fully charged battery is to be short-circuited by connecting the positive and negative terminals of the battery with resistance load of 80mΩ.Tests are to be conducted at room temperature 20~25℃. When the battery temperature drops to about 20% lower than the peak or the short-circuited time reachs 24h,the end of the test. 在室温20~25℃把充满电的电池的正负极用电阻为80mΩ的导线短路，连接起来使电池外部短路,当电池温度下降到比峰值低约20％时或短路时间达到24h时，结束试验。	No explosion, No fire The Temperature of the Battery surface not exceeded than 150℃ 无起火,无爆炸 电池表面温度不超过 150℃

3	Short test 短路测试(55℃)	Place fully charged cell in the environment of the 55 ℃ + 5 ℃, for the battery surface temperature of 55 ℃ + / - 5 ℃, 30 min again. Then use wire connecting the battery positive and negative extremes, and ensure that all external resistance for 80 mΩ, test battery temperature changes in the process of monitoring, when the battery temperature drops to about 20% lower than the peak or the short-circuited time reachs 24h, the end of the test. 将满电的电池放置在 55℃ ±5℃ 的环境中,待电池表面温度达到 55℃ ±5℃ 后,再放置 30mih.然后用导线连接电池正负极端,并确保全部外部电阻为 80mΩ .试验过程中监测电池温度变化,当电池温度下降到比峰值低约 20%或短路时间达到 24h 时，结束试验。	No explosion, No fire The Temperature of the Battery surface not exceeded than 150℃ 无起火,无爆炸 电池表面温度不超过 150℃
4	Forced discharge test 强制放电测试	A discharged cell is subjected to a reverse charge at 1C for 90 min. 将电芯放完电，以 1CA 电流反向充电 90min。	No explosion, No fire 无起火,无爆炸
5	Over charge test 过充电测试	After standard charge, continue to charge with a constant voltage 3C/4.6V per a cell, holding 7h or when the battery temperature drops to about 20% lower than the peak, the end of the test. 电芯标准充满电后，以 3C/4.6V 的恒定电压继续充电,保持 7 小时或当电池温度下降到比峰值低约 20%时或短路时间达到 24h 时，结束试验。	No explosion, No fire 无爆炸，无起火
6	Combustion test 燃烧喷射测试	Place the battery in test equipment of steel wire net, open burner, with flame heating batteries; Battery explosion, complete combustion or continuous heating reached 30min but the battery does not catch fire and does not explode. Then stop heating. 将电池放置在试验工装的钢丝网上，开启燃烧器，用火焰加热电池；电池爆炸，完全燃烧．或持续加热 30min 但电池不起火不爆炸，即停止加热.	Components (except for dust shape product) of the battery or batteries shall not penetrate aluminum network as a whole 组成电池部件(粉尘状产物除外)或电池整体不得穿透铝网

5 Cell initial Dimensions/电芯初始尺寸



NO	Items	Units :mm
1	Diameter/直径(D)	21.8±0.20
2	Height/高度(H)	70.5±0.50

Draw/制图	Checked/审核	Approved/批准

6 CAUTIONS IN USE(谨慎使用)

To ensure proper use of the battery please read the manual carefully before using it.

（为确保正确使用电池，使用前请仔细阅读本细则）

. Handling（电池操作）

- Do not expose to, dispose of the battery in fire.（不要靠近和放置电池于火中）
- Do not put the battery in a charger or equipment with wrong terminals connected.
  （在充电器或设备仪器中不要把电池接错电极）
- Avoid shorting the battery（避免电池短路）
- Avoid excessive physical shock or vibration.（避免电池过多的物理撞击和震动）
- Do not disassemble or deform the battery.（不要解剖和使电池变形）
- Do not immerse in water.（不要把电池浸泡在水中）
- Do not use the battery mixed with other different make, type, or model batteries.
  （不要和其它不同类型的电池混和使用）
- Keep out of the reach of children.（放置电池于儿童不易接触的地方）

. charge and discharge（充电和放电）。Battery must be charged in appropriate charger only.（电池必须用适当的充电器充电）

- Never use a modified or damaged charger.（不要使用改装或损坏的充电器）
- Do not leave battery in charger over 24 hours.（不要把电池放置于充电器超过 24h）

. storage(储存)：Store the battery in a cool, dry and well-ventilated area.（应把电池置于凉爽、干燥及通风良好的区域）

. disposal（电池处理）

- Regulations vary for different countries. Dispose of in accordance with local regulations.（电池处理要符合当地的规定）

7 Period of Warranty/保质期

The period of warranty is one year from the date of shipment. Great Power guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customer abuse and misuse.

电池的保质期从出货之日算起为一年。如果电池的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成，本公司负责退换电池。

8 Storage of the Batteries/电池的存放

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity.

We recommend that batteries be charged about once per half a year to prevent over discharge.

电池应当在室温下存放，应充到 30%至 50%的电量。如长时间储存，建议每半年充一次电以防止电池过放电。

9 Other The Chemical Reaction/其它化学反应

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

由于电池是利用化学反应的原理，所以随时间的增加电池的性能会降低，即使是存放很长一段时间而不使用。如果使用条件如充电、放电及周围环境温度等情形不在指定的使用范围内，会使缩短电池的使用寿命，或者会产生漏液导致设备损坏。如果电池长周期不能充电，即使充电方法正确，这样需要更换电池了。

10 Note/注释

Any other items which are not covered in this specification shall be agreed by both parties.

本说明书未包括事项应由双方协议确定。